



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 5
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US EPA RECORDS CENTER REGION 5



497694

MEMORANDUM

SUBJECT: Review of Acrolein research for the Reilly Tar and Chemical site

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DATE: 7/24/2012

Acrolein is used as a pesticide to control algae, weeds, bacteria, and mollusks. It is also used to make other chemicals. It is a colorless or yellow liquid with a disagreeable odor. It dissolves in water very easily and quickly changes to a vapor when heated. It also burns easily. Small amounts of acrolein can be formed and can enter the air when trees, tobacco, other plants, gasoline, and oil are burned.

Acrolein is formed by the reaction and photodecomposition of other airborne pollutants, such as 1,3-butadiene and allyl chloride. Forest product manufacturing processes that release volatile organic compounds emit appreciable amounts of acrolein to air. It has a half life of less than 24 hours in the air due to reacting with other chemicals and sunlight.

The main "non-pesticidal" use of acrolein is as the active ingredient used by oil companies to scavenge hydrogen sulfide from produced fluids in petroleum operations.

Acrolein can also be produced by various bacteria through anaerobic fermentation. *Bacillus-amaracrylus*, *Clostridium welchii* (perfrigen), *Escherichia* (Citrobacter), and one strain of aerobacteria can produce acrolein through the anaerobic fermentation of organic matter.

In soil, acrolein undergoes biodegradation, hydrolysis, volatilization, and irreversible sorption to soil. These processes are expected to significantly decrease the high infiltration rate of acrolein. The overall reactivity-based half-life of acrolein in soil is estimated to be between 30 and 100 hours.

Upon discussions with Dr Rodriguez-Kabana from the Department of Agriculture at Auburn University, it is hypothesized that the consistent findings on acrolein in the soil at the Reilly site are most likely from the anaerobic fermentation of organic material in the soil.